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## PART I - ADMINISTRATIVE

### Section 1. General administrative information

#### Title of project

Monitor And Protect Wigwam River Bull Trout For Koocanusa Reservoir

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**BPA project number:** 20008

**Contract renewal date (mm/yyyy):** 10/2000 ☒ **Multiple actions?**

#### Business name of agency, institution or organization requesting funding

British Columbia Ministry of Environment, Lands and Parks

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**Business acronym (if appropriate)** MELP

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#### Proposal contact person or principal investigator:

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#### NPPC Program Measure Number(s) which this project addresses

10.3B5

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#### FWS/NMFS Biological Opinion Number(s) which this project addresses

FWS 1999 Bull Trout Biological Opinion/1995 Biological Opinion for Salmon

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#### Other planning document references

N/A

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#### Short description

Protect Koocanusa Reservoir bull trout from inappropriate reservoir operating regimes and logging practices by monitoring spawner returns, juvenile densities, habitat conditions and water quality/quantity in critical habitats on the Wigwam River in B.C.

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#### Target species

Bull trout

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### Section 2. Sorting and evaluation

### ***Evaluation Process Sort***

CBFWA caucus	Special evaluation process	ISRP project type
Mark one or more caucus	If your project fits either of these processes, mark one or both	Mark one or more categories
<input type="checkbox"/> Anadromous fish <input checked="" type="checkbox"/> Resident fish <input type="checkbox"/> Wildlife	<input type="checkbox"/> Multi-year (milestone-based evaluation) <input type="checkbox"/> Watershed project evaluation	<input type="checkbox"/> Watershed councils/model watersheds <input type="checkbox"/> Information dissemination <input type="checkbox"/> Operation & maintenance <input type="checkbox"/> New construction <input checked="" type="checkbox"/> Research & monitoring <input type="checkbox"/> Implementation & management <input type="checkbox"/> Wildlife habitat acquisitions

### **Section 3. Relationships to other Bonneville projects**

***Umbrella / sub-proposal relationships.*** List umbrella project first.

Project #	Project title/description
	N/A

### ***Other dependent or critically-related projects***

Project #	Project title/description	Nature of relationship
9401000	Montana Fish, Wildlife and Parks - Libby Excessive Drawdown	B.C. will baseline data on stream habitat condition and bull trout abundance.
8346700	Montana FW&P - Mitigation for the Construction and Operation of Libby Dam	B.C. will baseline data on stream habitat condition and bull trout abundance.

### **Section 4. Objectives, tasks and schedules**

#### ***Past accomplishments***

Year	Accomplishment	Met biological objectives?
	N/A	


### ***Objectives and tasks***

<b>Obj 1,2,3</b>	<b>Objective</b>	<b>Task a,b,c</b>	<b>Task</b>
1	Establish baseline data on adult bull trout	a	Annual redd counts
		b	Fish fence operations
2	Establish baseline data on juvenile bull trout	a	Juvenile abundance sampling
3	Establish baseline data on stream habitat	a	Stream substrate study
4	Monitor water quality	a	Implement existing plan

### ***Objective schedules and costs***

<b>Obj #</b>	<b>Start date mm/yyyy</b>	<b>End date mm/yyyy</b>	<b>Measureable biological objective(s)</b>	<b>Milestone</b>	<b>FY2000 Cost %</b>
1	10/1999	10/2009	stable spawner returns		25.00%
2	10/1999	10/2009	stable juvenile densities		25.00%
3	10/1999	10/2009	suitable habitat		15.00%
4	10/1999	10/2009	status quo water quality		35.00%
				<b>Total</b>	100.00%

### **Schedule constraints**

Pre-logging assessment is a critical component of this project. Funding must be obtained as soon as possible to address this time constraint.

### **Completion date**

10/2009

## **Section 5. Budget**

**FY99 project budget (BPA obligated):**     \$0

### ***FY2000 budget by line item***

<b>Item</b>	<b>Note</b>	<b>% of total</b>	<b>FY2000</b>
Personnel	BC gov't (MELP) personnel	%3	2,000
Fringe benefits		%0	
Supplies, materials, non-	lab costs for water quality work	%28	17,000

expendable property			
Operations & maintenance	fish fence and related costs	% 3	1,500
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		% 0	
NEPA costs		% 0	
Construction-related support		% 0	
PIT tags	# of tags: 500	% 3	1,500
Travel		% 3	2,000
Indirect costs		% 0	
Subcontractor	fish component	% 33	20,000
Subcontractor	water quality component	% 17	10,000
Other	helicopter charter	% 10	6,000
<b>TOTAL BPA FY2000 BUDGET REQUEST</b>			<b>\$60,000</b>

### ***Cost sharing***

<b>Organization</b>	<b>Item or service provided</b>	<b>% total project cost (incl. BPA)</b>	<b>Amount (\$)</b>
Habitat Conservation Trust Fund	fish stock assessment	% 11	15,000
Montana Dept FW & Parks	fish stock assessment (in kind support)	% 1	2,000
Forest Renewal BC	watershed restoration	% 44	60,000
		% 0	
<b>Total project cost (including BPA portion)</b>			<b>\$137,000</b>

### ***Outyear costs***

	<b>FY2001</b>	<b>FY02</b>	<b>FY03</b>	<b>FY04</b>
<b>Total budget</b>	\$60,000	\$60,000	\$60,000	\$60,000

## **Section 6. References**

<b>Watershed?</b>	<b>Reference</b>
<input type="checkbox"/>	Oliver, G. 1979. Fisheries investigations in tributaries of the Canadian portion of the Libby Reservoir, 1978. Ministry of Environment, Lands and Parks, Cranbrook, BC
<input type="checkbox"/>	Westover, W. and D. Conroy. 1997. Wigwam River Bull Trout: Habitat Conservation Trust Fund Progress Report (1996). Ministry of Environment, Lands and Parks, Cranbrook, BC
<input type="checkbox"/>	Chirico, A. and W. Westover. 1998. . Wigwam River Bull Trout: Habitat

	Conservation Trust Fund Progress Report (1997). Ministry of Environment, Lands and Parks, Cranbrook, BC
<input type="checkbox"/>	Cope, S. 1997. Wigwam River Fish - Forestry Study: Preliminary Surveys (1997). Consultant rep. prep. for Ministry of Environment, Lands and Parks, Nelson, BC
<input type="checkbox"/>	Columbia Environmental Services. 1996. Upper Wigwam Stream Inventory. Consultant rep. prep. for Ministry of Environment, Lands and Parks, Nelson, BC
<input type="checkbox"/>	Lambert, J. 1997. Wigwam Watershed FRBC Water Quality and Quantity Inventory Design. Ministry of Environment, Lands and Parks, Nelson, BC
<input type="checkbox"/>	Klohn-Krippen Consultants Ltd. 1998. Bighorn Creek Integrated WRP Project. Consultant rep. prep. for Ministry of Environment, Lands and Parks, Cranbrook, BC

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## **PART II - NARRATIVE**

### **Section 7. Abstract**

This proposal outlines a bull trout stock and habitat monitoring program on the Wigwam River, a tributary to the upper Kootenai River. The Wigwam supports the largest and most important bull trout population in Koocanusa Reservoir, formed by Libby Dam. The project will provide baseline data to track changes in the population and assess the impact of reservoir operations, and will assist in identifying problems associated with logging developments planned for this watershed. The resulting baseline data will be used to assess the relative importance of reservoir operations vs. forest developments in impacting this population. The work plan includes operation of a fish fence, a tagging program, spawner counts, redd counts, juvenile abundance studies, annual habitat (substrate) assessments and water quality/quantity monitoring. The study results will assist in developing reservoir management strategies for Koocanusa Reservoir, reflecting the intent of Fish and Wildlife Measure 10.3B.5. The project will also link to habitat protection efforts associated with timber harvesting planned for the watershed.

### **Section 8. Project description**

#### **a. Technical and/or scientific background**

Koocanusa Reservoir, formed by Libby Dam, supports a significant population of adfluvial bull trout. The majority of these fish are thought to spawn in the Wigwam River, a tributary to the upper Kootenay River in British Columbia. The B.C. government has operated fish fences and counted bull trout spawners both before and after completion of Libby Dam (e.g., Oliver 1979, Westover and Conroy 1997). Redd counts have also been undertaken annually for the past 3 years in co-operation with the Montana Department of Fish, Wildlife and Parks (Chirico and Westover 1998). Overview level inventories of the watershed have been completed (Columbia

Environmental Services 1996) and one season of juvenile bull density information has been collected (Cope 1998). The latter study also provided cursory descriptions of substrate conditions. Forest Renewal BC has funded habitat assessment work and begun extensive habitat restoration work on Bighorn Creek, an important tributary to the Wigwam (Klohn-Krippen 1998).

The Wigwam and its bull trout population are amongst the highest fisheries priorities in B.C. In addition, with the ESA listing of bull trout in Montana, continued well-being of the Wigwam/Koocanusa population is critical. The impacts of reservoir operations on bull trout are poorly understood, and the population must be monitored closely over the coming years to ensure the current status of this stock is maintained. The Wigwam watershed is also currently being developed for forest harvesting. Roads and cutblocks associated with these developments are viewed as a potentially serious threat to bull trout in the drainage, and in Koocanusa Reservoir.

Plans to monitor the Wigwam's fish populations, habitats, and water quality have been discussed and partially developed by the B.C. government. Forest Renewal BC and the BC Habitat Conservation Trust Fund have funded partial delivery of these plans to date. However, many important aspects this work cannot be implemented unless additional funding is obtained. A comprehensive stock and habitat monitoring program, such as the project described in this proposal, is needed to assess the relative impact of reservoir operations on bull trout stock status, as opposed to habitat alterations resulting from forest developments.

#### **b. Rationale and significance to Regional Programs**

Section 10 of the 1994 Fish and Wildlife Program planning document ("Resident Fish") clearly identifies the importance of resident fish populations and the need for basinwide coordination among resident fish projects. This proposal is strongly in keeping with the intent of Section 10. By considering impacts upstream of the U.S. border, this project is in concert with the Council's requirement for a "systemwide approach".

Section 10.1 outlines the program goal: "...to recover and preserve the health of native fish injured by the hydro power system...". The project will allow us to separate the effects of reservoir drafts required for salmon flow augmentation from those caused by habitat damage resulting from forest harvesting. The work will protect a unique and valuable fish population which is being forced to adapt from a riverine to adfluvial life history strategy due to Libby Dam. Measure 10.3B.5 specifically addresses the need to evaluate the effects of Libby Dam on resident fish, and Wigwam bull trout serve as an excellent indicator of impacts on upstream (Koocanusa Reservoir) populations.

#### **c. Relationships to other projects**

To date, work on this project has been supported by a partnership between the B.C. government (MELP), the BC Habitat Conservation Trust Fund, and Forest Renewal BC. Considerable in-kind support has been provided by the Montana Department of Fish,

Wildlife and Parks in recognition of the importance placed on Wigwam bull trout by that agency. Given that Montana Department of Fish, Wildlife and Parks is already operating two major projects on Koocanusa Reservoir, expansion of these activities to include the system's most important bull trout spawning and early rearing area is appropriate.

**d. Project history** (for ongoing projects)

New project.

**e. Proposal objectives**

1. Provide Baseline Data on Adult Bull Trout
  - Enumerate and tag adult bull trout returning from Koocanusa Reservoir to spawn in the Wigwam River;
  - Monitor changes in age and size of bull trout;
  - Determine distribution of spawners and locate important habitats;
  - Analyse data and provide project progress reports;
  - Disseminate study results and insert into reservoir management and forest harvesting plans as appropriate.
2. Provide Baseline Data on Juvenile Bull Trout
  - Assess distribution and density of bull trout juveniles in the Wigwam River drainage;
  - Analyse data and provide project progress reports;
  - Disseminate study results and insert into reservoir management and forest harvesting plans as appropriate.
3. Provide Baseline Data on Stream Habitat Conditions
  - Monitor changes to substrate condition and habitat suitability;
  - Analyse data and provide project progress reports;
  - Disseminate study results and insert into reservoir management and forest harvesting plans as appropriate.
4. Monitor Water Quality
  - Implement previously planned water quality monitoring program;
  - Analyse data and provide project progress reports;
  - Disseminate study results and insert into reservoir management and forest harvesting plans as appropriate.

**f. Methods**

1. Provide Baseline Data on Adult Bull Trout

A fish fence will be operated during October to capture bull trout as they emigrate from the Wigwam after spawning. Methods will follow procedures used with a very high level of success in previous work on this system. Note that only a portion of the work previously undertaken will be funded by B.C. programs in the future, and thus the budget

described in this proposal will augment rather than replace an existing program. All fish will be measured, weighed, sexed and tagged (PIT and Floy). All fish and tag data will be stored electronically and shared with partnering groups. Analyses will focus on changes in numbers of spawners, frequency of repeat spawners, and growth rates. Redd counts will be conducted from the air and on foot. Counts will provide data which can be readily compared to work from previous years. As in previous work, ground-based work will involve agency staff from BC and Montana. Redd sites will be georeferenced in the field using hand-held GPS receivers, and the resulting data will be stored electronically along with data from previous years. These data will be submitted to government and industry forestry planners, and used by MELP habitat protection specialists to assist in defending fish resource values.

## **2. Provide Baseline Data on Juvenile Bull Trout**

Multiple-pass electrofishing will be employed to assess densities of juvenile bull trout and other species. Electrofishing efforts will build on previous work in this area. Sites will be selected on the basis of stream reaches, and will provide data on fish densities in pool, riffle and glide habitat units. Habitat descriptions will be completed for each site, and each will be georeferenced in the field using hand-held GPS receivers.

## **3. Provide Baseline Data on Stream Habitat Conditions**

Pebble counts and sediment core samples will be used to track changes in stream substrate conditions and predicted bull trout egg survivals. Sites for pebble count work will be selected to coincide with juvenile studies. Coring work will be undertaken at locations known to support heavy concentrations of bull trout spawners. Each site will be georeferenced in the field using hand-held GPS receivers. The resulting data will be stored electronically along with data from previous years.

## **4. Monitor Water Quality**

A detailed water quality monitoring plan developed earlier by MELP (Lambert 1997) will be implemented. This will include examination of stream stage, temperature, a variety of chemical constituents, periphyton and benthic invertebrates. A total of 24 sample sites are outlined in the plan, and these will be used to track changes resulting from forest harvesting, road building and watershed restoration work. Again, all sites will be georeferenced.

## **g. Facilities and equipment**

Specialized equipment will be required to allow assessment of fish abundance, habitat conditions and water quality. Fish fence materials and tagging equipment are already available but will require maintenance and replacement from time to time. Specific requirements include PIT tags, spaghetti (Floy) tags, temperature loggers and a flow meter.

## **h. Budget**

The majority of budget items identified in Section 5 are self-explanatory using the detail in the “note” column. Costs for personnel are minimal, and associated with recoverable salary costs for key MELP staff involved in setting up the program. A substantial cost (\$17,000) will be incurred for laboratory analyses of water samples, as part of the water quality monitoring program. Fish fence materials are already in place, but are subject to loss/deterioration and must be replaced. PIT tag costs are self explanatory, and based on previous fish counts through the fence. Travel is required for MELP and contract staff to undertake all elements of the field (N.B. some of the travel is for in-kind MELP staff support in the field program). Contracts will be required for the adult, juvenile and habitat studies, and are based on minimum estimates of costs of similar work undertaken in this area and elsewhere in the Kootenays. Costs for the water quality/quantity study are also minimum estimates, taken from the plan developed by Lambert (1997). All costs outlined are only part of the project requirements; other funding from Forest Renewal BC and the Habitat Conservation Trust Fund will be used to bring the entire program on line.

## **Section 9. Key personnel**

The majority of work described in this proposal will be completed by contractors, selected through a bid process. Qualifications of contract personnel will be considered as one of the most important elements during the bid selection process. We expect at least contractors with Masters Degrees in fish biology, and direct experience on the Wigwam, would be interested in the work. A small component of the budget has been set aside for MELP staff salaries to cover involvement by the Senior Fisheries Biologist for the East Kootenay (W. Westover), who has 27 years of experience and several years background on the Wigwam and Kootenay systems. Due to Mr. Westover’s limited involvement and costs, a resume as required in this section has not been included.

## **Section 10. Information/technology transfer**

All work described in this proposal will be incorporated in annual progress reports. These will be distributed to partnering agencies and other interested parties as they are completed. MELP has a Web server in the Kootenay Regional Headquarters office (Nelson, B.C.), and will also offer these publications through such media. All fish, habitat, water quality and water quantity data will be stored in MELP-standard databases whenever possible. Georeferencing of sample sites will allow attachment of all information to spatial databases. The Kootenay Regional Headquarters office of MELP is further advanced than most of its other regional counterparts in the areas of data management and GIS, enabling us to perform analyses rapidly as questions arise from interested parties within or outside the agency/province. Lastly, information will be regularly forwarded to habitat protection biologists and others involved in forestry planning, to ensure the fish resources in this area are given the highest possible consideration during these developments.

## **Congratulations!**